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TARGHEE - TETON

BARK BEETLE CONTROL PROJECT



MOUNTAIN PINE BEETLE.

Dendroctonus monticolae Hopkins

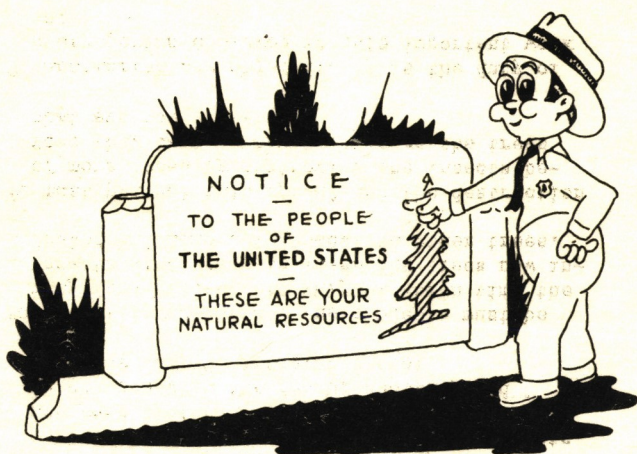
IN LODGEPOLE PINE

THIS NOTEBOOK BELONGS TO

FINDER PLEASE RETURN TO ME OR TO

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE - INTERMOUNTAIN REGION
BUREAU OF ENTOMOLOGY
AND
PLANT QUARANTINE
1949

GENERAL INSTRUCTIONS



You are employed on the largest bark beetle control project ever to be undertaken in the United States. The work is being done to stop a serious outbreak of the mountain pine beetle which threatens to destroy valuable commercial and scenic lodgepole pine forests. Everyone employed is an integral part of a large team with the job of spotting and treating 60,000 infested trees.

To be fully successful, the projects must be completed before late July at which time the insects will begin to leave the trees now infested and make new attacks on other trees.

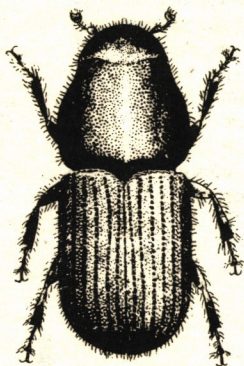
We must prevent this spread and the destruction of more trees by destroying the insects before they have a chance to leave the trees that are now infested.


To accomplish our objective it is the duty of every person employed in this important work to:

1. Know his job thoroughly.
2. Accept nothing but thorough work.
3. Work safely without accident.

ABOUT THE MOUNTAIN PINE BEETLE

The adult mountain pine beetle is black, cylindrical in shape, slightly less than 1/4 of an inch long, and not quite as big around as a match. Trees are attacked by female beetles which tunnel into the inner bark and work along the surface of the wood. Galleries are always constructed upward. They vary from less than a foot to several feet in length. There may be a half dozen or more galleries in each square foot of bark surface. Soon after the attacks are started, male beetles enter the tunnels to mate with the females.



 ACTUAL
SIZE

ADULT

ENLARGED

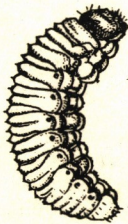


ENLARGED



EGG


Eggs are laid along the sides of this tunnel and packed in with boring dust or frass. During late summer the eggs hatch into small white grubs (larvae), which feed out laterally into the soft inner bark. They are inactive during the winter, but resume feeding in the spring and become full grown in late July when they transform to adult beetles. The stage of the transformation which occurs at the ends of their feeding tunnel is known as the pupa. The newly formed adult beetles emerge and immediately attack other green trees.



ACTUAL
SIZE

LARVA



 ACTUAL
SIZE

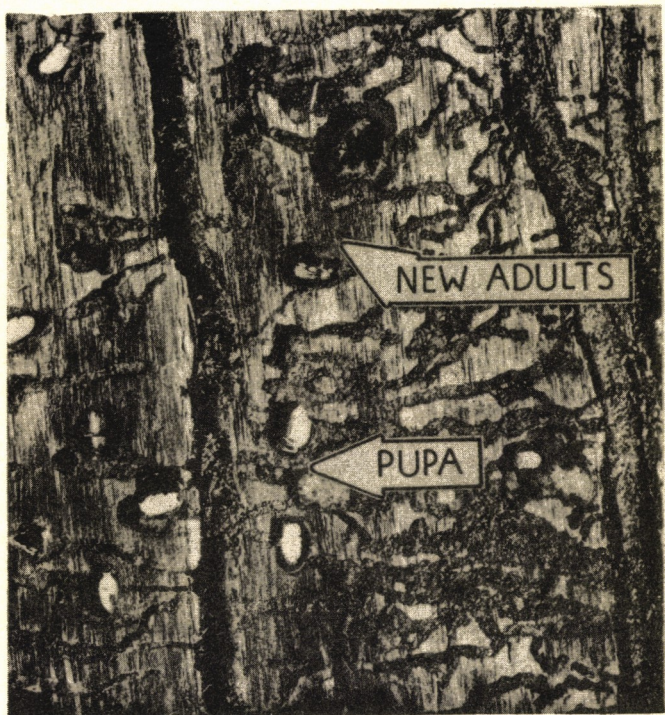
PUPA

Although there is but one generation of this insect each year, the females after completing one egg gallery and laying eggs, sometimes emerge and make a second attack in another tree. This usually occurs in early fall. However, some of the females remain all winter in the trees which they first attacked and emerge and make their second attack the following June. These June attacks are of no great importance as they are few in number.

There is usually a flow of pitch from the injured living bark which occasionally is so heavy that the beetles are washed from the entrance hole. These are called "Pitched out Attacks." However, on most attacked trees this flow of pitch mixed with boring dust flows from the injured living bark and is pushed from the entrance hole by the male beetle, forming a "Pitch Tube" on the bark surface. On some trees these tubes are quite small and difficult to see. Pitch flow usually stops after one or two inches of the tunnel has been constructed.



EARLY SPRING BROOD



EARLY SUMMER BROOD



LARGE PITCH TUBES



BLIND ATTACKS

SPOTTING CREW, ORGANIZATION AND DUTIES

Spotting is the job of finding and marking infested trees for follow-up "Treaters". It is the first step in the actual field work of bark beetle control. The success of the entire project rests on an A-1 spotting job.

Where working between previously laid string lines a spotting crew consists of five men: a chief spotter and four spotters. It is their job to find, mark, and map every infested tree within their assigned area.

DETAILED DUTIES OF SPOTTING CREW PERSONNEL

Chief Spotter

The chief spotter is in charge of a single spotting crew and is responsible for their work. He must (1) see that all infested trees are found and marked and (2) make sure that the location of the marked trees is properly shown on a strip location map previously prepared by a compass man and (3) provide the treating crews with copies of his maps and (4) provide the camp manager with proper records of crew's work.

These maps are an essential requirement of the treating crews to provide for an easy and quick relocation of trees to be treated. The actual field location of marked trees is shown on a tag which is hung on the string line opposite the trees. The tags will be placed on alternate lines.

In the operation of a spotting crew, the chief spotter follows at a distance which will permit him to keep all members of his crew in proper formation. He must be in a position to assist each crew member as the need occurs. He must travel back and forth across the four chain strip of the crew to check for missed trees and to see that infested trees are properly marked. When trees are located for marking, he calls the tree numbers to the spotters, and records their position on map made by the compass man. Fig. 1. It then becomes known as the spotters' map. Fig. 2.

Compass Man

The compass man is under the direction of the woods boss or camp boss and will work ahead of the spotters and lay string lines to mark off spotting strips in the area assigned to the spotting crew. He starts from a point selected by the woods or camp boss and paces the distance across the area on a predetermined compass bearing. The string line is laid as he travels this course. This is done by tying the end of the string to a branch or tree and then carrying the conical ball of string on the end of a stick or on a frame attached to his back. The string unwinds as the compass man moves forward. As these lines are laid the compass man will make a simple map (Fig. 1.) showing, in addition to the location of string lines, such important physical features as the main streams, prominent ridges, fencelines, roads, trails, etc. He must leave room on the map to plot the location of infested trees.

The starting point of each string line is marked with the number of the line on a tree blaze or stake. Tags may be used for this purpose. This point and string line stations at ten-chain intervals are marked on the map. For example, the start of a string line will be marked "Line #1", or whatever number it may be; the first ten-chain station "Sta. 1-A", the second station "Sta. 1-B," and so on to the end of the line. All stations or marks established in the field must be shown on the map by a number enclosed in a triangle.



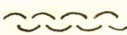
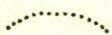
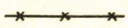
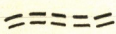

Points for Compass Man to Remember

Make all map recordings as small and neat as possible. Always use a sharp pencil. Make tree blazes carefully. Poor or dead trees should be selected for station marks - never healthy vigorous trees. If none but healthy trees are present, use stakes at least 4 feet high.

When the end of the strip line is reached, the compass man will offset the required number of chains in the direction determined by his supervisor chief spotter, and return on a compass line parallel to the first line. This will be string Line #2 and so marked on the map. Stations will be established at ten-chain intervals the same as on Line #1. There is no need to keep the stations on different string lines opposite each other.

String lines will be laid four chains apart. The width of strips will be set by project officers prior to starting the work, and will not be changed unless by one authorized to do so.

LEGEND FOR
COMPASS MAN'S MAP

●	String line ends.		Stream.
— — —	String line.		Swamp.
— A —	Station marks.		Ridge.
	Type line.		Fence.
	Woods road.		Building.

LEGEND FOR
CHIEF SPOTTER'S MAP

1-59 Number of inf. trees in strip.

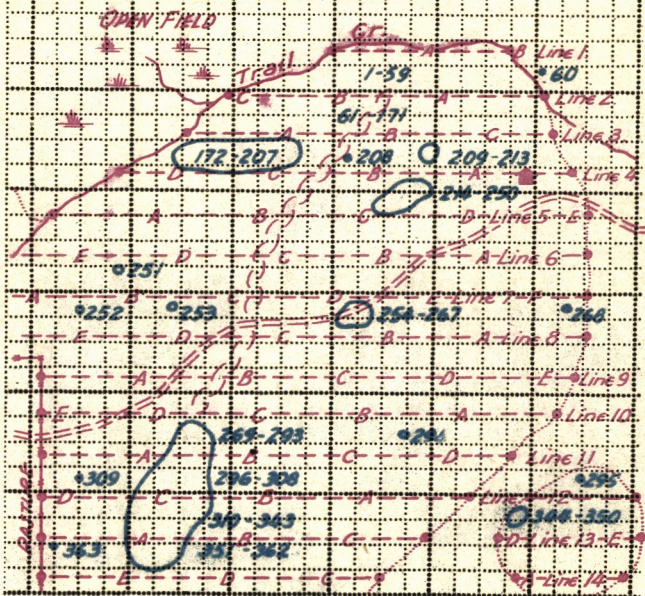
(172-207) Number of inf. trees in group.

o 208 Single infested tree showing number.

UNITED STATES DEPARTMENT OF AGRICULTURE—FOREST SERV

Land district. Mag. declin. Area
Sec. 28 T. 41 N., R. 117 W. Mer. Scale 8
(Subdivision and section)

CHIEF SPOTTER'S MAP



Date May 16, 1948. Platted by John Joe.
363 Bug trees, marked by tags on alternate string lines.

Spotting Crew Instructions

Spotters find and mark the infested trees. It is their job to look at all lodgepole pine trees on their assigned strip and to mark those containing active broods of the mountain pine beetle. The four spotters work abreast of each other, and each spotter examines all lodgepole pine trees on a strip one chain (66 feet) wide. To examine all trees it is necessary for each spotter to follow a weaving course as he moves forward on his strip. By looking ahead he can plan his course to pass near all the trees to be examined with the least amount of travel. It is necessary to pass close to, and to look carefully at, every lodgepole pine above four inches in diameter. Some infested trees show pitch tubes which are a visual external evidence of attack, easy to see. Others are difficult to see. There is always some external evidence of attack but it may be only a bit of reddish dust in the cracks of the bark, a few small holes the size of BB shot, or a few small pitch tubes. It is because of these "blind attacks" that every tree must be examined closely.

As the spotters advance, moving back and forth across their strips, the chief spotter follows to check the formation and work of his crew. When a spotter finds a tree which he may think is infested he quickly examines it for the presence of mountain pine beetle brood (eggs, larvae, pupae, living adult beetles). The presence of live brood is all the evidence needed to mark the tree for treating. Old trees, which have been killed for a year or two, will sometimes have only dead adult beetles in the top of egg galleries. Such trees must not be marked.

When trees are to be marked, the spotter calls "NUMBER". The chief spotter will call back the serial number to be used, which the spotter writes on the blazed surface of the tree. Each individual tree, or the outside trees of a group, are blazed on two or three sides so that they can be seen from several directions.

Spotters must keep a good formation. Calling back and forth between adjacent workers helps other crew members to keep their position. When one or more spotters stop to examine or mark trees, the others must wait. If there are more than a few trees to mark, the chief spotter will direct the other members of the crew to assist.

Trees are often missed, first: when the crew formation is temporarily lost at the end of a strip while the spotting crew is turning around; and second: when working in large groups of infested trees. The first cause of error can be corrected by holding a correct formation to the end of the strip, and by establishing this formation before starting back on the next strip. The second cause of missed trees can be corrected by respotting areas where large groups of infested trees have been marked.

Spotters' maps showing the location of the marked trees are passed to the camp manager for use of the treating crews. As treating usually follows spotting closely, treating foremen may require additional maps each night. This means that adequate copies of spotters' maps must be kept up to date at all times. Extra copies are made in the field by inserting carbons and thin white paper. This makes a nice map and the dots on the original are eliminated. A large scale progress map and a progress record are maintained in each camp office, making it necessary for chief spotters to make daily reports of the area covered and number of trees marked.

DESIGNATION OF SPECIFIC RESPONSIBILITY IN SAFETY
FOR CHIEF SPOTTERS AND TREATING FOREMEN

The chief spotter or foreman's place in safety is definitely one of responsibility. He shall be held accountable for the safe, efficient work of each crew member.

He should familiarize himself with all specific instructions outlined by the Safety Officer and must be constantly alert to observe such hazards that may appear in conducting his daily work. These hazards should be reported to the Safety Officer so that proper action can be taken to correct any unsatisfactory condition. Each crew member must be keenly alert at all times. It shall be the responsibility of the Chief or Foreman to recognize sluggishness, lack of interest or carelessness and weed these men out not only to improve the efficiency of the crews, but this type of a man is a potential safety hazard.

It shall be the responsibility of the chief spotter or foreman to thoroughly train and familiarize each crew member with the safety program and no man shall be assumed to be exempt from safety instruction.

The Chief or Foreman will supply each crew member with a First Aid Kit and definite instructions for proper treatment of any accident however small it may be.

In case of an accident, the Chief shall take prompt action. If in the judgment of the Chief or Foreman a Doctor is needed a man shall be dispensed immediately to report; otherwise efficient aid shall be administered on the spot. A prompt report will be made of time, place, cause, name of witnesses and so forth. Accident forms will be available at each camp office. Familiarize yourself with these forms so that you may make available all information necessary for complete and accurate investigation of every accident to prevent any future recurrence.

A Chief or Foreman found to be lax in enforcing the safety regulations and observing them himself will be immediately discharged.

Suggestions for improving and extending this safety program are earnestly solicited from all employees. Your cooperation is absolutely necessary in making this insect control job accident free.

Treating Crew, Spraying Instructions

The objective of the nozzleman is to obtain a good, saturated coverage of the tree from the top of the infested part of the tree to the ground line. There is only one right way to do this because the height of the infested portion of the tree cannot be determined from the ground.

Spray all trees to a four inch top diameter. When this four inch top diameter cannot be reached, oil each tree as high as possible. With the hand and power pumps on the job the ortho-oil mix can be applied to a height of 35 feet.

To get the right coverage, the mixture must run. That is, the stream must be held until the oil flows down the tree. To just wet the tree until it is dark colored is not enough - make the spray flow.

Trees are sprayed from at least four sides. Pick the four inch top diameter or the highest point you can reach and direct the stream to it. Stretch your arms up - it helps a lot! If the wind bothers, wait a bit for a quiet spell. Nearly full force gets the best results for height. Remember, breeze and branches knock off a lot of footage.

Stand close to the tree. Hold the stream at the highest point for a moment until the spray starts to run down the tree. Always spray from the top down.

Back slowly away from the tree as you work the stream down and reduce the pressure. Pressure is reduced with the power pump by closing the shut-off valve - with the stirrup pump by slowing down the pumping. Hold the nozzle steady, aim for the center of the tree. Avoid any drastic or sweeping up and down movement of the nozzle, but get a good coverage. You should be able to see the oil running down the bark.

When you are spraying the lower part of the tree you should be 18 feet away from it if you have space. The farther away the more force can be used without having the spray splash off. Give the thick bark at the base a good soaking. Be careful in backing away from the tree, to avoid falling.

Always spray the tree from at least four sides - larger trees need more. Spray the side toward you. Don't try to spray along the edge of the tree -- too much bounces off.

Don't spray directly into the wind. A treater can stand a little to one side of the wind just as well.

Watch the drift of the spray and keep the other men in the crew out of it. Give them a "break" if they have to cross around the down-wind side. Watch the pack stock, don't let drift blow on them.

In using the stirrup pump or other hand pump, teamwork between the treater and the operator is essential. Such teamwork will permit the treater to move around the tree with a minimum of effort, and will produce an efficient working pressure for the treatment of the different portions of the tree.

Wet Trees

When necessary to treat trees with bark which has been saturated from rain or snow the spray must be applied slowly and methodically. When the first coverage has penetrated the bark, apply a second. Missed spots on dry trees are easy to see. Extra care must be taken on wet trees to be sure that all the bark is covered, thoroughly. Oil all wet trees twice, if they are saturated with water.



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